INDUSTRIAL STANDARDIZATION

and Commercial Standards Monthly

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The American Standards Association is organized to provide systematic means of cooperation in establishing American Standards to the end that duplication of work and the promulgation of conflicting standards may be avoided; to serve as a clearing house for information on standardization work in the United States and foreign countries; to act as the authoritative American channel in international cooperation in standardization work

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Commercial Standardization Services of the Bureau of Standards

by

Lyman J. Briggs, *Director*
National Bureau of Standards

The work of the Divisions of Simplified Practice, Specifications, and Trade Standards, and the Building Code and Safety Standards Sections

The decision to transfer certain activities of the National Bureau of Standards to the American Standards Association was announced in the July issue of *Industrial Standardization and Commercial Standards Monthly*. The work and accomplishments of the Divisions and Sections, activities of which will be gradually taken over by the ASA during a transition period, are here described by Dr. Lyman J. Briggs, Director of the Bureau. Articles on the various Divisions and Sections, prepared by those in charge of the work at the Bureau, will be published in coming issues.

The Government's economy program has necessitated the curtailment of certain activities heretofore carried on by the Bureau of Standards. Most of the work which the Bureau has been doing in the field of simplification, commercial standards, building codes, and safety codes is being discontinued, and other allied activities are being greatly reduced.

Many of the services being curtailed or discontinued have been conducted in cooperation with the American Standards Association, the scope of whose activities has been enlarged from time to time to cover activities of the type being carried on by the Bureau.

The ASA Board of Directors has expressed the opinion that the general field of activity of the following Divisions and Sections of the Bureau of Standards lies within the scope of the American Standards Association as defined in its present constitution:

Division of Simplified Practice
Division of Specifications
Division of Trade Standards ("Commercial Standards")
Division of Building and Housing, Building Code Section
Safety Standards Section

Brief outlines of the history and accomplishments of these Divisions and Sections are given below.

I

Division of Simplified Practice

Simplification is a vital factor in the philosophy of business management. It has been broadly defined as "that policy of management which attempts to conduct all activities and to perform all functions of an enterprise in the least elaborate manner consistent with any given purpose."

Simplification is sometimes confused with standardization, but the two activities are essentially different. Standardization is primarily technical and creative. The function of simplified practice is to determine which sizes, items, or other factors of a product are most important from a commercial standpoint, and to concentrate production on them as exclusively as possible. Simplified practice is simplification applied throughout an entire industry in respect to any of the products or methods of that industry.

Simplification is based on the industrial axiom that it costs less to make a quantity of articles all alike than to make the same quantity in several different sizes or kinds. Simplification finds its widest and most successful application in the field of every-day commodities produced in large quantity.

The first study of possibilities for nation-wide simplification was undertaken by the Council for National Defense, and the work was later taken over by the War Industries Board, under the chairmanship of Bernard M. Baruch. Once under way, it developed into true simplified practice. After the close of the World War, the work was continued only on a small scale, since during the immediate

post-war boom, there was little incentive to increase variety. The slump following that boom brought with it the usual effect of a buyers' market, and during the ensuing period of recovery, the need for national simplification became increasingly obvious. During any period of depression, sales pressure tends toward excessive variety of products, and such variety must be reduced to accelerate recovery.

As a result of the growing recognition of the necessity for simplification, there developed a demand among business leaders for a centralized agency to apply in time of peace those principles which had been so successfully applied during the World War. The Division of Simplified Practice was therefore established in 1921, under the Bureau of Standards of the Department of Commerce, to cooperate with manufacturers, distributors, and users of commodities for the purpose of eliminating waste through reduction of unnecessary variety of methods and products. Simplified practice in time of peace is necessarily a voluntary activity on the part of all concerned, the Division of Simplified Practice having no enforcing or regulatory powers. A Planning Committee, composed of representative business executives and professional men, cooperates with the Division in formulating its policies.

The Division does not initiate simplification projects, nor attempt to dictate or even suggest definite things to be done. Its function is purely cooperative, as a neutral, disinterested coordinating and centralizing agency to develop and make effective the best thought and practice in an industry. Simplified practice projects may be initiated by any element of an industry, *i.e.,* manufacturers, distributors, or users. No matter which group initiates the project, it must not only receive the full support of all other groups, but those groups must have an active part in formulating the project and in making it effective throughout the industry.

The experience of the Division has shown that the success of a simplification project depends on four fundamental steps. These steps are carried out by committees of the industry concerned, in cooperation with the Division of Simplified Practice:

1. A comprehensive survey of demand for existing variety
2. A sound and conservative elimination of nonessential items, with proper consideration of the needs of all groups affected
3. Enlisting the active support of producers, distributors, and consumers
4. Maintaining the interest and adherence by keeping the program abreast of current practice through periodic revision

Broadly speaking, the benefits of simplified practice accrue not only to those directly concerned with a specific project, but eventually to individuals and firms indirectly, even remotely, interested. There is no way of measuring the total effect of any one simplified practice project, much less that of all simplified practice developed during the past twelve years. It is possible, however, to state definitely the important qualitative benefits which have accrued to the principal groups concerned.

The manufacturer benefits from longer runs on each size or kind of product or part, simplified inspection requirements, fewer varieties of tools and machines, less idle equipment, which all contribute to reduced production cost.

The benefits to the distributor are no less real. He gains through reduced stocks and faster turnover. He carries fewer items of slow-moving stock, and largely avoids obsolete items. His greatest gains, however, usually result from the fact that the stock he buys conforms to an established simplified list.

Benefits accrue to the consumer principally through industrial competition. If a manufacturer reduces the cost of his product, he may retain a portion of the savings, but sooner or later he will take advantage of reduced costs to seek more business, through reduction in price, improvement in quality, or better service. The distributor does likewise, and the consumer gets the final benefit in price, quality, service, or otherwise.

Experience has demonstrated the benefits of simplified practice. It is nationally recognized as essential to modern management, and its economic value has been proved. The Division has completed 150 Simplified Practice Recommendations, covering a wide range of commodity groups. More than 11,000 different organizations and individual firms are now listed as acceptors of these recommendations, several having accepted two or more of them. The total number of acceptances recorded for the recommendations exceeds 20,000. Adherence to existing recommendations is being continuously stimulated by annual reviews, and new recommendations are being developed. It is already apparent that the demand for simplification will grow steadily and rapidly during the period of business recovery. This tendency is shown in the rapid adoption, by manufacturers of simplified products, of a plan of identification which was suggested by representative consumers.

Technical handbooks, and manufacturers' catalogs, lists, and other trade literature are, to an increasing extent, identifying the specific Simplified Practice Recommendations, by number and title. This plan

is beginning to be used in connection with advertising matter. The final results of all this are increased knowledge of, and adherence to, the effective Simplified Practice Recommendations.

The subject of simplified practice, as exemplified in the activity of the Division of Simplified Practice, has been included in the curricula of a number of colleges and universities in this country and abroad. Foreign governments have observed with interest the progress of simplification in the United States, and have, through quasi-governmental agencies, translated into their respective languages the procedure developed by the Division of Simplified Practice. One such organization has adopted this procedure, virtually verbatim, for its own guidance.

2

Division of Specifications

In response to numerous requests from State agencies for aid in the formulation of standards, specifications, and methods of tests for their purchases, a conference of official representatives of the State Governors was held under the auspices of the Department of Commerce in Washington on May 25, 1923, to determine in what way the Department could best be of service to the State purchasers. The conference expressed its approval of the proposal to review the specifications in use throughout the country and to issue a "handbook" or "encyclopedia" for the use of tax-supported purchasing agencies covering the entire field of standards, specifications, simplifications, and tests which may be determined as the best adapted for public purchases, the publication in each instance to be formulated in consultation with the different agencies particularly concerned.

For the purpose of obtaining the benefit of advice from the agencies interested in the proposed undertaking, there was organized an Advisory Board composed of official representatives of 14 national organizations interested in the preparation, unification, and utilization of commodity specifications. In addition to having on the Advisory Board its own representative, the then Chairmen A. W. Whitney, the American Standards Association, at that time the American Engineering Standards Committee, was indirectly represented on the Board by six official representatives of four of its Member Bodies; namely, the American Electric Railway Association, the American Society for Testing Materials, the National Electric Light Association, and the Society of Automotive Engineers. Of the eight other organizations represented on the Board, five were organized consumer groups—governmental and nongovernmental, two were trade-paper groups, and one was the National Association of Manufacturers.

The Advisory Board recommended that the work of publication be broken into two distinct parts, a "Directory of Specifications" and an "Encyclopedia of Specifications"—the directory to consist of an index of existing specifications, the explanatory matter being restricted to what is necessary for the elucidation of the scope of the particular specification, and the encyclopedia to contain the actual specifications (or abstracts) instead of merely titles.

When the first issue of the National Directory of Commodity Specifications appeared in 1925, the entire membership of the Board expressed its thorough indorsement of the undertaking, and recorded formally the need for the services rendered by the department.

In 1932 the Directory was issued in revised and enlarged form, after the 1925 edition had been sent to press four separate times without revision. In the Directory are listed by title, designating number, and sponsoring organization, standards and methods of test for all commodities regularly produced in this country. Each specification is also briefly summarized as to technical characteristics, scope, and special applications. These special features aid the user of the Directory in selecting specifications suited to his particular needs, and make it very useful for all large buyers whether Federal, State, municipal, or other.

Three volumes of the Encyclopedia of Specifications have been issued as follows: "Standards and Specifications in the Wood-Using Industries" in 1927, "Standards and Specifications for Nonmetallic Minerals and Their Products" in 1930, and "Standards and Specifications for Metals and Metal Products"[1] in 1933. In these volumes are reproduced, without duplication, the actual text of all standards and specifications in the indicated industries—which have been adopted by national trade associations, technical societies, and those agencies which speak with the authority of the Federal Government as a whole.

In October, 1925, there was submitted to members of the above-mentioned Advisory Board an outline of a proposed plan for compiling for distribution to tax-supported agencies a list of manufacturers desirous of supplying commodities under contracts based on Federal Government commodity specifications and willing, when requested to do so, to issue to the purchasers certificates guaranteeing

[1] See INDUSTRIAL STANDARDIZATION AND COMMERCIAL STANDARDS MONTHLY, July, 1933, p. 116.

the compliance of the commodities with the specification requirements. It was explained that the proposed plan was not to be considered as limited in application to the Federal specifications, although the Bureau of Standards was limiting its own activities to those specifications.

At the December 10, 1925, meeting of the American Standards Association considerable time was devoted to the discussion of the certification plan which had been described by Director Burgess of the Bureau of Standards at a meeting of the ASA on November 12, 1925. No action was taken.

On January 8, 1926, Director Lord of the Bureau of the Budget stated that he was in full accord with the views expressed by Dr. Burgess concerning the desirability of increasing the use of nationally recognized specifications and as to the necessity for devising some method for accomplishing this. In his words:

> "I am referring your letter to the Chief Coordinator with instructions to work out details and determine what steps in the matter may be necessary and desirable to carry out your proposed plan, in so far as it may require action by the agencies under my direction."

The Director of the Bureau of the Budget made suggestions concerning certain details involved in applying the plan to Federal specifications; the Chief Coordinator requested that copies of the lists of willing-to-certify sources of supply be distributed to all Federal Government departments and establishments, and he issued a bulletin to the heads of all departments and establishments relating not only to the certification plan but also to the labeling plan sketched below. The Federal Purchasing Board approved the certification plan in principle; the Federal Specifications Board made arrangements for determining to which Federal specifications this plan should be applied; and the Federal Standard Stock Catalogue Board put into use a symbolic method for indicating, in the index to Federal specifications, for which of these specifications there had been compiled lists of sources of supply of commodities guaranteed to meet the specification requirements.

Thus far the certification plan has been applied to 404 Federal specifications and 38 commercial standards formulated by the interested industries under the auspices of the Bureau of Standards. The 442 lists of willing-to-certify sources of supply represent a total of 18,610 requests for listing from 8,762 separate firms.

In accordance with the labeling plan, already referred to, a firm desiring to bring effectively to the attention of the "over-the-counter" buyer, at the time of making a purchase, commodities which it is willing to guarantee as complying with the requirements of certain nationally recognized specifications (which may or may not be those of the Federal Government) places on the individual commodities or their containers labels which definitely identify both the specification and the manufacturing firm or the trade association which holds itself responsible for the guarantee.

In carrying forward the above-noted work, surveys were made of the commodity standardization activities of American technical societies, trade associations, and consumer groups to determine the extent to which they have formulated standards and specifications and have developed plans for encouraging manufacturers to produce commodities conforming to certain nationally recognized standards and specifications and to enable the buyer to identify goods complying with specification requirements. The material compiled in these surveys has been used actually in several chapters of the *Standards Yearbook* and in other publications.

3

Division of Trade Standards

In October, 1927, as an outgrowth from simplified practice, the Bureau of Standards set up a procedure for the cooperative establishment of definite grades and qualities on given commodities as commercial standards. This segregation of the work made it possible to render a better service to industry by concentrating on the particular phases of the problem which are presented and the special difficulties which confront an industry.

It may be well to differentiate between simplified practice and commercial standards more fully. Simplified practice is the elimination of excess or unnecessary variety of sizes, dimensions, types, and immaterial differences on the basis of production and demand, whereas commercial standards are specific limitations below or beyond which the grade, quality, composition, or dimensions of the commodity shall not be allowed to fall. All of the procedure steps arranged to promote the establishment of commercial standards are designed to attain this result.

One outstanding purpose of commercial standards is to facilitate, for the small as well as the large purchaser, the specification method of buying and to make that effective as far as practicable without constant resort to tests. The organization in charge of commercial standards was first known as the Commercial Standards Unit, but the value of the service was so apparent to industry and the demand for the service increased so rapidly that in July, 1929,

it was recognized under the broader title, "Division of Trade Standards."

The chief purpose of the work is to catch, and to hold from present or future retrogression, commercial progress toward ideals of commodity quality and performance by encouraging the voluntary establishment of commercial standards as a basis for marketing, inspection, testing, acceptance, or rejection. It is unthinkable that the consumer will willingly relinquish nationally recognized means and methods of checking the quality and value of the goods he buys. Therefore, it is hoped that the commercial standard will act as a ratchet in the advance of sound merchandising methods.

The function of the Division of Trade Standards in work of this character is fourfold: First, to provide a neutral agency which will insure adequate consideration of the needs of all interests and maintain confidence in the integrity of the method; second, to supply such assistance and advice in the development of this program as past experience with similar programs may suggest; third, to solicit and record the extent of adoption and adherence to the standard; and fourth, to add all possible prestige to this organized effort to establish adequate standards by promulgation of the commercial standard if and when it is adopted and accepted by all elements directly concerned.

There is at least one essential difference between commercial standards and those specifications adopted by engineering and technical societies. The former are established as a basis for the daily needs of trade, while the latter are intended mainly to cover contract purchase requirements for specific uses with the assumption that the items are regularly available, but without regard for the method of disposal of items rejected by such specifications. Experience indicates that in most commodities the proportion of goods purchased on specification has heretofore been small, and therefore the disposal of rejected items held little economic significance. With the constantly increasing use of specifications as a basis of purchase, the importance of rejected items has risen to a controlling position. Commercial standards, unlike most other specifications, are designed as a basis for marketing for an entire industry and naturally must take into account or provide for the items which are rejected by the specification. In general, the line between acceptable goods and seconds is thereby materially widened, thus stimulating the industry to produce a greater and greater proportion of acceptable goods to obtain the surer rewards.

Manufacturers are encouraged to apply self-certifying labels to the commodity, guaranteeing the quality or measurements to conform to all requirements and tests of the commercial standard. In the event the goods are of such a nature as to inhibit the direct use of "guarantee" labels, a registered symbol may be employed as a certification of quality when supported by full "guarantee" labels on the cartons or other container in which the commodity is delivered to the consumer.

It behooves consumers and distributors to examine the guaranty statement carefully to see whether it is so worded as to constitute a binding part of the sales contract.

For example; does it identify the guarantor? Does it identify the product? Does it identify the specification or standard on which the guaranty is based? Unless it does identify each of these essential elements in a perfectly definite way there may well be some question as to the validity of the guaranty.

Associations which are sponsoring commercial standards as a means of restoring confidence, particularly the consumer groups, are convinced that consumers can readily be taught to distinguish between bona fide guaranty labels which are binding on the seller and the bogus ones which merely appear to be so.

Honest, straight-from-the-shoulder guaranty labels which embody the three essentials mentioned above, reflect the character of the producer, or the seller, or the association standing back of the merchandise as the case may be. Whereas, dishonest labels attempt to create an illusion of a binding guaranty but omit one or more of the prime essentials, and a careful examination leaves the reader in a hazy state of mind as regards the responsibility of the seller.

4

Division of Building and Housing

The Division of Building and Housing has aimed to help place the construction industry on a sound economic basis, and to encourage the development of improved types of housing construction. It directed its activities to fields of effort where opportunities for constructive action were great, and where a limited amount of activity on its part would supply the necessary link in a whole chain of efforts throughout the country.

The Division's work on building and plumbing codes illustrates its methods. The purpose of such codes is to protect the safety and health of the public. The lack of uniformity in local code requirements to assure these ends had long been known; but during the World War it was forcibly demonstrated in connection with the war-time housing developments of the Federal Government, when it was found that

economical methods of construction whose soundness had been proved by many years' use in some cities were not permitted in others. The three-inch plumbing soil stack, long the accepted practice for small house construction in some cities, was one example —the United States Housing Corporation had to threaten to withdraw one of its large projects unless a certain city would permit its use.

The organization and method followed by the Department of Commerce Advisory Building Code Committee was as follows: A committee of seven professional men having no direct interest in the production or sale of any building materials, but conversant with the engineering and architectural practices for all types of structures, was appointed by the Secretary of Commerce in 1921. This committee was attached to the Division of Building and Housing, which provided it with staff assistance. After reviewing existing codes and recommended practices, it would prepare a draft indicating recommended requirements for use in local building codes. Each preliminary draft was sent to several hundred architects, engineers, local building officials, building material trade associations, and others. Their comments and criticisms were then carefully considered by the Committee in preparing the final printed report. On a number of controversial points, experimental research and testing work was carried out at the Bureau of Standards laboratories. In some cases, second and even third tentative drafts were prepared.

The reports issued covered the following subjects:

Recommended Minimum Requirements for Small Dwelling Construction, 107 pages (two editions)
Recommended Minimum Requirements for Plumbing, 283 pages (three editions)
Recommended Minimum Requirements for Masonry Wall Construction, 57 pages
Minimum Live Loads Allowable for Use in Design of Buildings, 38 pages
Recommended Practice for Arrangement of Building Codes, 29 pages
Recommended Building Code Requirements for Working Stresses in Building Materials, 53 pages
Recommended Minimum Requirements for Fire Resistance in Buildings, 58 pages

The plumbing report was handled by a subcommittee composed chiefly of professional men, with representation for different branches of the industry.

When the staff work had to be discontinued on account of the economy program, reports on administration, building exits, precautions during erection, signs and billboards, and other topics, as well as several revisions of earlier reports, were under way. The report on building exits was undertaken in cooperation with a committee working under ASA procedure.

In general, the reports of the Building Code Committee, a group of distinguished architects and engineers enjoying a national reputation and representative of leading professional societies, carried great weight with local groups engaged in framing or revising codes. Existence of the reports was advertised not only through circular announcements, and notices in trade and professional journals, but in the course of obtaining information for tabulations issued by the Division of Building and Housing showing the year of adoption, scope, and other details of building codes throughout the country.

A large proportion of such codes have had no major revision for from eight to fifteen years or more. Such codes are unsatisfactory, either in failing to give the public the protection which it deserves or in requiring excessive use of materials at some points, or in preventing the use of economical materials or methods, or in all these respects. Failure to bring codes up to date is due partly to rivalries of local groups seeking to obtain competitive advantages. Such rivalries frequently result in delay, or complete stalling, of building code revisions in city councils, while both the public, and the construction industries as a whole, suffer. Frequently, points involving bitter controversies involve but little business. In spite of such difficulties, reports of the Building Code Committee are known to have been used, wholly or in large part, in building code revisions undertaken in at least 300 cities and in the plumbing codes of a comparable number, as well as in statewide plumbing regulations in at least 10 states.

The Building Code Committee took the position that requirements stated briefly, and in terms of performance, would prove most satisfactory, and not hamper progressive developments as much as highly detailed codes. For example, the Committee advises that, under certain circumstances, partitions meeting a one-hour fire-rating test be required. It lists certain types of construction known to meet such a test, but the way is left open for any new material or combination of materials to be accepted upon proof that it meets the test.

Other phases of the Division's work have dealt with city planning and zoning, where an advisory committee has prepared standard state acts, enabling cities to zone and to create city planning commissions. These standard acts have been used in legislation adopted in 37 and 13 states respectively.

In the field of small house construction, the Division cooperated with the committees of the Presi-

dent's Conference on Home Building and Home Ownership, and prepared a popular handbook entitled "Care and Repair of the House."

Other work, which may be classified under the general heading of economics and statistics, included studies of seasonal operation in the construction industries, planning and control of public works, home financing, methods used in real estate appraisals, the conducting of detailed local real estate inventories as a means of helping to stabilize local building and real estate cycles, and the preparation of one of the Government's best sellers—"How to Own Your Home."

5

Safety Standards Section

The work of the Bureau of Standards in formulating safety standards was inaugurated about twenty years ago when Congress made an appropriation for an investigation of the hazards involved in using high potentials. The investigation of these hazards naturally led to the consideration of means for preventing accidents of this nature, and a final result was the formulation of a safety code which is designated the National Electrical Safety Code.

After investigating electrical accidents and the varying practices involved among different operating companies, it was thought that standardization of practice according to the best methods in use would be an important safety factor. Attention was consequently first given to operating rules, and the first edition of such rules was published in August, 1914, as circular No. 49. This was revised and a second edition published in May, 1915.

Three other parts of the code were issued in April, 1915, as circular No. 54. These dealt, respectively, with the construction of generating stations and substations; the construction and maintenance of overhead and underground transmission and distribution lines; and utilization equipment. A second edition was published in December, 1916, combining the operating rules of circular No. 49, and this was widely distributed and received considerable use and careful study, especially by the public utility companies concerned. Parts of it were adopted in certain States by the commissions having appropriate jurisdiction, and it was used as a basis for orders issued in some other States.

The 1916 edition of the code was issued for the main purpose of trial and criticism, as a result of which a third edition was issued in 1920 as a more definite standard for general application and where utility and industrial commissions desired formal orders, for legal application.

The investigation of electrical accidents and the formulation of the National Electrical Safety Code were inaugurated by Dr. E. B. Rosa, who was at that time chief physicist of the Bureau. The detailed work was in charge of W. J. Canada until 1917. In that year Dr. M. G. Lloyd was put in charge of the work and has since then been Chief of the Section of Safety Standards. Dr. Rosa devoted a great deal of time to this work, and it held his close interest until the time of his death. His personal efforts gave a most decided impetus to the movement for a series of national safety codes which developed immediately following the World War.

During the war the United States Government for the first time gave detailed attention to the prevention of accidents in its own industrial plants, such as the arsenal and navy yards. Safety engineers were appointed, and these safety engineers formed an informal organization for cooperation in their own work. The Bureau of Standards was called upon by them to assist in formulating a series of safety standards for application in the government establishments.

The work which had been done in formulating these standards for the Government's own use seemed so valuable that it was suggested that similar standards should be formulated for general use throughout the country. An interest was shown in this idea by all those concerned with accident prevention and especially by the various State commissions concerned with factory inspection and with the general safety of workers. Realizing the importance of safety codes prepared upon a national basis, and as a result of demands for extension of its previous work, the Bureau called a preliminary conference on this subject at Washington in January, 1919, and a second conference in December of the same year. These conferences were attended by delegates from the national engineering societies; by Federal, State, and municipal officials; by representatives of employers and employees; by representatives of the casualty insurance companies, and by other persons interested in accident prevention. At these conferences the subject was fully discussed, the needs for national codes generally recognized, and the best method for preparing them given full consideration. It was finally agreed that the scheme of procedure in establishing national standards which had recently been inaugurated by the American Standards Association would be the most satisfactory to utilize in the preparation of safety codes. To do this it would be necessary to enlarge the scope and membership of the Association, and this was done as a direct result of these conferences.

The National Safety Code Committee, later designated as the Safety Code Correlating Committee, was organized by the Bureau of Standards, the Bureau of Labor Statistics, and the National Safety Council. This committee acts in an advisory capacity to the American Standards Association. Its first report included a list of 37 safety codes which were considered of the most immediate importance, and for which sponsor bodies were recommended. Since that time it has made additional recommendations from time to time, and has advised the ASA with respect to action in approving the membership of sectional committees and in approving completed safety codes.

The Bureau of Standards has continued to take an active part in the work of the American Standards Association, the Safety Code Correlating Committee, and the working sectional committees which actually prepare safety codes. The Bureau accepted sole sponsorship for three codes which it has already prepared, and joint sponsorship for six others. It has published five of these codes.

Representatives of the Bureau of Standards have served on the sectional committees which have prepared, or are now in course of preparing, 31 other codes in the series of national codes. In many of these the Bureau representatives have played only a minor part, while in others they have taken a very active part in securing the necessary data and experience and in formulating the regulations.

In addition to its work in preparing industrial safety codes, the Bureau has given attention to the prevention of accidents to the public and in the home. Some of the safety codes referred to have to do with the protection of the public rather than of industrial workers, such as the codes for Automobile Brakes, for Colors of Traffic Signals, Automobile Head Lighting, Street Traffic Signs, Walkway Surfaces, and the Lighting of School Buildings. The Bureau has given special attention to the prevention of accidents in the home and has issued two editions of a circular devoted to "Safety for the Household."

Revised Commercial Standard for Fuel Oils

Commercial Standard CS12-33 on Fuel Oils (Second Edition), which has been released by the Bureau of Standards, covers the important characteristics essential to satisfactory burning oils. Six distinct grades are described with limits as to flash point, water and sediment, pour point, distillation range, and viscosity. Experience has indicated the necessity of limiting the above characteristics in order to provide for the satisfactory burning of fuel oils which before the appearance of definite grade standards was limited only by gravity—an index now looked upon as a very poor indicator of volatility or viscosity.

In addition to the above requirements there are some oils used for heat treatment and in glass and ceramic furnaces, and other special uses where a low sulphur requirement is necessary. To meet this special need the second edition of this standard carries a table showing sulphur content of each grade that may be used by the purchaser of these oils.

The standard was originally published in 1929 as the Commercial Standard for Domestic and Industrial Fuel Oils CS12-29 but upon recommendation of the standing committee it was revised and with some minor changes was recommended for acceptance under the abbreviated title of "Fuel Oils," CS12-33.

Endorsement of the revised standard was received from practically all the more important oil refiners, many distributors and organized consumers, together with practically all the burner manufacturers. Accordingly, the revised standard was made effective May 1, 1933.

The pamphlet, in addition to the standard specification, includes a list of acceptors and a brief history of the project. Copies can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at five cents each, or through the office of the American Standards Association.

The Public Administration Service

Centralized purchasing will be one of the many functions of the Public Administration Service, a newly organized cooperative consulting and research agency for cities, counties, states, and other governmental units. "The service will aid public officials to bring about a constructive economy in government by revising and installing budget and other financial systems, by designing work programs, and improving organization and methods," according to the official announcement.

The following bodies participated in establishing the new organization: American Legislators' Association, American Municipal Association, American Public Welfare Association, Governmental Research Association, International City Managers' Association, Municipal Finance Officers' Association, United States Conference of Mayors, and National Municipal League.

The Public Administration Service will be located at 850 East 58 Street, Chicago.

Standardization in Electrification of Pennsylvania Railroad

by

J. V. B. Duer,[1] *Electrical Engineer*
Pennsylvania Railroad

Railroad applies standardization successfully to construction on right-of-way, substations, and rolling equipment

The first installation of electric service on the Pennsylvania Railroad was made on the Burlington and Mt. Holly Branch of the Amboy Division, between Burlington and Mt. Holly, New Jersey, in 1895, the first car being run on July 22 of that year. In this electrification, three trolley cars of the suburban type were used. The electric operation of this branch was continued for six years with satisfactory results, but was discontinued, and steam operation was resumed in 1901, following the destruction by fire of the power plant which supplied the current.

This installation was followed by the electrification of portions of the Long Island Railroad in 1905. This electrification used direct current, supplied to the rolling equipment from a third rail, at a relatively low voltage. The electrification today covers most of the suburban service operating out of Jersey City, all the suburban service operating out of Philadelphia, and the trunk-line service from New York, through Philadelphia, to Wilmington, Delaware, on the south and Paoli, Pennsylvania, on the west. The program in prospect will carry this system southward from Wilmington, through Baltimore, to Washington, D. C., and eventually westward to the vicinity of the Susquehanna River. This electrification uses alternating current, supplied to the rolling equipment through an overhead contact wire at a pressure of 11,000 volts and a frequency of 25 cycles.

The alternating-current system was adopted as standard on the Pennsylvania Railroad at the time the electrification between Philadelphia and Paoli was installed in 1915. The original a-c electrifications, to Paoli and Chestnut Hill, used indoor-type substations, and transmission was at 44,000 volts. When the major program of through electrification was inaugurated it became evident that transmission would have to be at a higher voltage, and a standard of 132,000 volts was decided upon. At the same time, outdoor-type substations were adopted as a standard.

As the electrified territory has been extended during the past few years, the problem of standardization of parts and equipment has become of increasing importance. This is true not only from the standpoint of first cost, but also from that of keeping the inventory of maintenance parts to a minimum.

To accomplish this standardization, the first step was, of course, the preparation of proper specifications. The engineers in charge of the design prepared such specifications covering all types of equipment and items of material. Where national standards were available, reference was made to them in these specifications.

Construction on right-of-way

A discussion of the electrification falls naturally into three main subdivisions, as follows:

1. Construction on the right-of-way, including catenary and transmission-line supporting structures, foundations, overhead wire systems, track bonds, etc.
2. Substations
3. Rolling equipment

Standardization, as applied to the first of these subdivisions, is in many ways more difficult to accomplish than in the case of the other two. Conditions to be met vary between the widest extremes. Each stretch of narrow right-of-way, each cliff near the railroad, each overhead bridge, each wire crossing, and each tunnel present problems that require special consideration.

In the first place it was necessary to determine upon a standard type of construction. Supporting the transmission circuits on the catenary structures

[1] Member of the following sectional committees under ASA procedure: Pipe Flanges and Fittings (B16); Definitions of Electrical Terms (C42); Rotating Electrical Machinery (C50); National Electrical Safety Code (C2-1927); Scientific and Engineering Symbols and Abbreviations (Z10).

lends itself best to the needs of the system, and this construction was adopted. It was necessary to adopt standards for the overhead construction, and a catenary system consisting of a 5/8-inch bronze messenger wire, a 4/0 grooved copper auxiliary wire, and a 4/0 grooved bronze contact wire was decided upon.

The foundations for the catenary supporting structures offered the first field for detailed standardization. This question was carefully studied and standard types of foundations were designed. As the work has progressed it has been possible to reduce their number, and on the last section constructed 95 per cent of the foundations were of five types, and 70 per cent were of the same type.

The supporting poles were next attacked from the standardization standpoint. On the earlier construction projects each location was treated separately, and there were comparatively few structures which were duplicates of any other structure in the line. On the latest section constructed, covering approximately 23.9 route miles, 73 per cent of the poles were of five sizes and 53 per cent were identical. Even those poles required to meet special conditions are of the same general design and closely approach the standard types.

By progressive design, the number of types of transmission-line crossarms has been reduced to four for all normal construction, including transpositions. Practically all special conditions can be met by the use of two or three additional types.

Cross catenary wires and cross beams and guys have also been carefully standardized. A new type of signal bridge, using columns and a cross beam instead of the familiar bents and truss, has been developed for electrified territory.

When the overhead wiring is considered, one of the most important items to which standardization should be applied is the span length for the catenary system. The messenger wire is strung to a predetermined tension and permitted to hang in its natural position. The hangers which are used to support the auxiliary wire from the messenger are spaced at 30-foot intervals and the clips between the auxiliary and contact wires are spaced 15 feet apart, staggered with respect to the hangers. It may readily be seen that if the spans are varied only in 15-foot steps, two sets of hangers would fulfill all conditions for tangent track, and two additional sets for each curve of different radius; whereas, if the span length changes in variable steps, the number of sets of hangers could well become very large. On the later electrifications great care has been exercised in locating the poles to take advantage of this fact and the number of different hanger lengths required has been reduced to a minimum.

Hardware and fittings, insulators, wire sizes, etc., have been carefully worked out, and quite complete standardization effected with a relatively small number of items.

Substations

Three general types of substations are used on the electrification:

1. Step-up substations, where energy is supplied from generators, or frequency changers, through step-up transformers to the transmission system
2. Step-down substations, where the energy is supplied from the transmission system to the contact conductor system, through step-down transformers
3. Switching stations, where there is no transformation of voltage, but where switching of the distribution circuits is accomplished

The character and the layout of each substation of each type are, of course, affected by many conditions; such as, capacity required at the point in question, emanation of branch lines from the vicinity of the substation, real estate available, etc. However, much has been accomplished in the way of standardization.

The same general type of construction is used in all step-down substations, that is, fabricated columns and trusses for the high-tension structure and H-column construction for the low-tension structure. Many of the substations are of identical design and construction.

Foundations, not only for the substation steel but also for the apparatus as well, are thoroughly standardized. For instance, the step-down transformers are supplied by different manufacturers, but all use the same foundation. The same is true of circuit breakers, and other substation equipment.

Further, the apparatus itself has been carefully standardized. The transformers mentioned above, while coming from different makers, are identical in capacity and may be operated together in the same substation. Similarly, it would be possible to move a transformer from any substation to any other substation and have it perform satisfactorily. The high-speed trolley circuit breakers are furnished by different manufacturers, but they are the same as to speed of operation and interrupting capacity, and may be used interchangeably. The same is true of the other items of equipment which may be furnished by any one of a number of different manufacturers.

Rolling equipment

The locomotives, which have been secured for the through electrification, are the result of development over a long period. These locomotives are of three types, two for passenger service and one for freight service. One of the passenger locomotives, the type O1, has two pairs of drivers and will develop 2500 horsepower, and the other, the type P5a, has three pairs of drivers and will develop 3750 horsepower. The freight locomotive, known as the type L6, has four pairs of drivers, and will develop 2500 horsepower.

Experience with construction and maintenance has indicated that in any class of electric locomotive, any part should be readily removable and replaceable, and that in so far as possible, all parts should be interchangeable between individual locomotives of the same class. The desirability of still further applying this principle as between different classes of locomotives is evident.

With the cooperation of the electrical manufacturers this has been accomplished. In the P5a locomotive, any unit or part, armature, motor, brushholder, transformer, or control unit will fit into and perform properly in any locomotive assembly, regardless of the manufacture of other parts in that assembly. Close coordination between the manufacturers and the railroad in the development of designs, checking and approval of drawings, and other detail was necessary to accomplish this.

This principle has been further developed in the locomotive assemblies in that each complete locomotive assembly consists of three units: a chassis unit, a deck unit, and a cab unit.

The chassis unit consists of the drivers, trucks, main frame, spring rigging, brake rigging, motors, flexible drives, main transformer, and train heating boiler, together with the necessary water and oil storage reservoirs and air, oil, and water piping.

The deck unit carries the main control groups, air compressor, miscellaneous items, main wiring, and most of the control wiring.

The cab unit forms a weatherproof housing for the locomotive crew and apparatus. It contains the master controllers and the engineer's brake valves, the lighting and its wiring, some of the control wiring, the bells, whistles, headlights, sanders, as well as the louver for admitting ventilating air to the motor and transformer blowers.

Each of these three units may be assembled independently of the other units and the completed units assembled into a complete locomotive.

The interchangeability of electrical parts on the three classes of locomotives is practically complete. The unit switches, master controllers, air compressors, and motors, pantographs, motor-driven blowers for motor ventilation, and relay systems are identical. The preventive coils and transformers are identical on the O1 and L6 locomotives, but on the P5a are larger because of the greater capacity required.

Although the assembled motors on the O1 and P5a locomotives are of the twin-armature, frame-supported type and those on the L6 locomotives are of the conventional single armature, axle-supported type, the individual parts of the motors, including armatures and stators, are identical except that a larger pinion bearing is used on the axle-supported motor to take care of the higher duty required by the freight gearing. The stators may be pressed into or out of either type of frame.

The mechanical parts of the O1 and P5a locomotives are interchangeable to a large extent; the driving wheel assemblies, including the bearings, are the same; truck assemblies are the same, and many parts of the spring and equalizing rigging as well as many parts of the brake rigging are identical. In addition, many of the parts used to make up the apparatus deck and cab structure are the same.

The electrical and mechanical parts of the latest design of multiple-unit cars are completely interchangeable, regardless of manufacture.

Throughout the development of the electrification project on the Pennsylvania Railroad the importance of standardization of parts and equipment as well as of methods and procedure has become increasingly apparent. Constant effort has been expended toward decreasing the number of parts and types of equipment and construction. The preceding discussion has attempted to point out, briefly, the measure of success which has attended that effort.

Woodworking Company Saves through Use of Standards

The effective use of standardization, even in the manufacture of such an apparently unstandardizable product as novelty tables, is described by E. F. Werner in the *Wood-Worker*. Although the company about which Mr. Werner writes manufactures tables in many shapes and sizes with different moldings and carvings, it has been able to substitute for its former practice of carrying some of each kind of finished table in stock the more economical practice of stocking only a limited number of standard semi-finished parts from which any size or shape ordered can be quickly fabricated. Less material is carried with no danger of obsolete designs or finishes depriv-

ing the company of the profits contained in the products sold. Nails, screws, and finishing materials also have been standardized.

"It was surprising," says Mr. Werner, "that the packer had to have several kegs of nails in his department, and the cabinet shop likewise. Now, the cabinet shop gets the nails from the crater, and the amount carried on hand is just about one-half. The same applies to screws. Why it was necessary to have 1¼—10 on one thickness of lumber and 1¼—12 on another of exactly the same thickness and under the same conditions could never be explained satisfactorily. The screws are now kept in a central locker room and given out as needed, with instructions that not more than two or three days' supply shall be had in the various departments. That means lower inventories.

"Throughout the entire plant, changes in procedure have been made. Materials that we thought absolutely necessary have been eliminated, with no inconvenience at all. In a number of instances we found that the particular item we were using was special for our company. By making slight changes in equipment, jigs, and forms we are able to use standard items regularly carried in stock in our city and actually save money, as we had been paying a premium on the special material. We can get the merchandise within 24 hours, and the amount bought at any one time is just about 15 per cent of that formerly purchased.

"Many other changes and improvements could be enumerated, most of them, to be sure, saving only a few dollars on one particular item, but in the aggregate amounting to quite a sum. The most important thing in the entire set-up is the necessity of having someone responsible for the proper carrying out of the procedure."

Foreign Standards Available from ASA

New foreign standards available to ASA Members for loan or purchase through the ASA office are listed below. They are available in the language of the country under which they are listed. In requesting copies of the standards it is necessary to list only the serial numbers preceding the titles. Send either a post-card or a note containing the name of the person wishing to receive the standards, and the numbers of the standards desired. The card or envelope should be addressed to the American Standards Association, 29 West 39th Street, New York.

Serial Number

Holland

385. Rubber-insulated conductors for heavy current without armoring (one and two layers of rubber)
386. Single-core heavy-current paper-insulated cables (600 volts)
387. Three-core heavy-current paper-insulated cables (3,000 and 6,000 volts)
388. Three-core heavy-current paper-insulated cables (10,000 volts)
389. Two-, three-, and four-core heavy-current paper-insulated cables (500 volts), with auxiliary wires, heavy construction
390. Two-, three-, and four-core heavy-current paper-insulated cables (500 volts), with auxiliary wires, light construction

Germany

391. High-speed presses, letter-type printing, bearer and bed widths
392. High-speed presses, letter-type printing, chases
393. High-speed presses, letter-type printing, locking plates, form-lifting boards
394. High-speed presses, letter-type printing, sizes of lockup

Great Britain

395. Railway signalling symbols, part two, wiring symbols and written circuits
396. Rolled steel disc-wheel centers for electric tramway cars
397. Steel conduit and fittings for electrical wiring
398. Synthetic resins (phenol-aldehyde type) for the manufacture of boards, tubes and cylinders
399. Tensile tests on thin metal sheet and strip
400. Totally enclosed air-break switches for voltages not exceeding 600 volts
401. Tractive armature direct-current neutral line relays
402. Trolley and contact wire and trolley wheel groove for electric traction
403. Woven wire and perforated plate sieves and screens for industrial purposes
404. Wrought-iron and mild-steel hooks for cranes, chains, chain slings and general engineering purposes (excluding building operations)

International Standardization in the Field of Paints[1]

by

Dr. C. P. A. Kappelmeier[2]

A review of the work in various countries on paint specifications and methods of test; the possibilities of international standardization

So many different problems of a heterogeneous nature are included in the field of paints that the trend toward unification is in general slower and the application of standardization more difficult than has been the case for many other technical products. That the benefits of standardization may nevertheless be obtained in this field has gained wide recognition in the last few years, however, and there is no need to insist here upon the necessity of standardization.

As is well known, the British Standards Institution in England, and the American Society for Testing Materials in the United States, have led in the standardization of paints by establishing definite quality specifications and methods of test for pigments and components of carriers as well as for finished products. Other countries have followed by taking similar steps.

The accomplishments of the German Association for Testing Engineering Materials (DVM) and of the Federal Board for Purchase Specifications (RAL) have been known to the readers of this magazine for years. The following organizations which have taken up the work on standardization of paints in other European countries should also be mentioned: the Swiss Association for Testing Engineering Materials (SVMT), Zurich; the Austrian standardizing body (OENIG), Vienna; and the Main Committee for Standardization in the Netherlands, The Hague.

The French national standardizing body (AFNOR), Paris, has not yet started standardization of paints. In France, there are only a few individual specifications, which have been established by the aircraft ministry.

According to the latest information from the Polish national standardizing body, standardization of pigments is being developed in Poland. Although this field has not yet been entered in Sweden, the Swedish national standardizing body (SOS) considers it to be only a question of time before the standardization of paints will be taken up in that country.

The fact that in the USSR the groups concerned are convinced of the economic necessity of standardization of paints was pointed out in an article[3] published some time ago by Dr. Hans Wolf, Berlin.

Belgium, Denmark, Finland, Italy, and Norway, on the contrary, have no intention as yet—according to information received from the national standardizing bodies in these countries—of extending their activities to the field of paints.

With the exception of the United States, Australia is, so far, the only country outside Europe where any appreciable activity in this field has been displayed. The Standards Association of Australia (S.A.A.) has published several thoroughly worked-out specifications concerning paints which in many respects are similar to the English examples.

In Canada, the Canadian Engineering Standards Association (C.E.S.A.) published some time ago a specification for paints, but afterwards withdrew it, as it did not appear to be satisfactory in practice.

Japan is understood to be preparing specifications for drying oils and paints. Drafts have been prepared by the Japanese Engineering Standards Committee in Tokio, but they have been available up to the present time only in the Japanese language. English translations will appear later.

This brief review of the present efforts toward standardization in the field of paints does not claim to be entirely complete. For example, the writer does not have reliable information from the South American countries. All references which are important to the general picture are, however, included.

Basis for international cooperation

It thus appears that all activities having for their purpose the benefiting of both the producers and users of paints through the advantages of standardi-

[1] Translation of an article from *Farben-Zeitung*, Berlin, January, 1933.

[2] Laboratorium der N. V. Vernis- & Verffabriek v/h H. Vettewinkel & Zonen (Laboratory of the N. V. Varnish and Paint Works—successors to H. Vettewinkel & Son).

[3] Farben-Zeitung 37, 1013 (1932).

zation are being carried out at the present time exclusively within the framework of the different national boundaries. These questions have not yet been considered from the international point of view.

Other branches of industry have made much greater progress in this respect. The recognition that standardization work yields its greatest benefits only if international agreement is reached led as long ago as April, 1926, to the discussions held during the Third International Standardization Conference in New York. These discussions resulted in the establishment, in October, 1928, in Prague, of the International Standards Association (ISA), whose secretariat is now located in Basle. It would lead too far afield to list within the framework of this short article the many technical subjects relating to the construction of engines and machines, the automobile and airplane industry, shipbuilding and agricultural equipment, the metal-working industry, etc., in regard to which the numerous technical committees of the ISA[4] have already—so few years after the establishment of this body—accomplished valuable results, thus securing a practical triumph for the slogan, applied to standardization activities, "through the national to the international." In so far as the requirements of the paint industry are concerned, the most essential fact in this connection is that an organization is already in existence, and active, which could lead to international uniformity in this field, also. The question now remains to be examined—whether it is desirable, in the field of paints, to expand the standardization activities, which so far have been only national, to an international movement; and if so, in what way this goal should be approached.

Progress in national standardization of pigments

It is self-evident that in this respect one thinks first of all of the most important pigments used in the manufacture of paints, since these pigments—as compared to the carriers—are of a simpler chemical composition, and, therefore, more suitable for standardization. Relatively great progress has been made, therefore, in national standardization of important pigments. That standardization of even the most simple dry paints is more or less chaotic from the international point of view, however, will be shown by taking red leads as an example.

In all countries in which standardization, or the establishment of purchase specifications for pigments, has been taken up, consideration has first been given to the lead paints, because of their importance. Since the value of a red lead, otherwise free of defects, is for the greater part determined by its content of PbO_2—or, respectively, Pb_3O_4—several of the specifications relating to this matter contain items for the determination of this content by chemical analysis. At the present time, however, the variety of the methods suggested for this purpose in the specifications is astonishing.

National standards now in use

In the United States, the Bureau of Standards specifies the well-known iodometric determination of the PbO_2 content according to Topf-Diehl, which is also commonly used in many other countries; for example, in Italy, where no official specifications for dry paints exist. In England and Australia, the oxidizing value of red leads is determined on the basis of the direct action on sodium thiosulphate in a saturated sodium acetate solution mixed with acetic acid followed by iodometric titration of the unused thiosulphate (Method of Liebig and Figg). In Germany, the RAL specifications number 844B, in which the permanganate according to Lux is used, are still valid.

Although it is true that Switzerland and Holland have already established, in their recommendations for standards, items relative to the content of different kinds of red leads, they have not yet given any method for the determination of the content by analysis. I assume that the reason for this is essentially the same in Switzerland as it is in Holland; namely, the recognition of the difficulty of making a choice. In Holland, however, questions of a chemical analytical nature arising on this score are still being thoroughly studied by a committee of experts especially appointed for this purpose, even though the Dutch standard sheet N901, which appeared about six months ago, contains quality specifications for 23 dry paints and paint bases in tentative form.

Red leads do not, of course, belong to those inorganic pigments, the determination of whose contents constitutes a problem of extraordinary difficulty for the chemist, as is the case, for example, in the analysis of chromium green and similarly mixed dry paints. Nevertheless, there is no doubt that the different methods of determination are the source of all kinds of possible errors. Even if one is not so gloomy in regard to the practical difficulties as are M. LeBlanc and E. Eberius in their recently published article on "The Determination of Actinic Oxygen in Lead Oxides"[5]—in which they stamp all present methods of PbO_2-determination, almost without exception, as erroneous or unreliable—he

[4] The electrical industry has already established an independent international organization, the International Electrotechnical Commission (IEC).

[5] Zeitschrift fuer Analytische Chemie 89, 81 1932.

will have to grant that the last word on whether the analytical method is preferable for this purpose has not yet been said. Unprejudiced investigators now seldom contest the fact that the oxydimetric methods, particularly the in no way impeccable permanganate method of Lux referred to above, do not give practicable values. Iodometric determinations also may contain errors, but these are more easily avoided or, at least, reduced to a degree which may be disregarded in practice.

However this may be, one thing is certain where a product having a world market, as in the case of red lead, for example, is concerned; that is, that the different methods used in the several countries for determining the content must necessarily lead to practical difficulties. This is particularly true since it is becoming habitual for purchasers and suppliers to base their contracts on a definite minimum content of PbO_2. The fact that, because of the analytical methods applied, the same product is considered from a different basis in each of the several countries leads to a condition which in the long run is untenable.

Unification of methods needed

The elimination of the possibility of such potential controversies is highly desirable. In the last analysis they have their source not in subjective causes but in objective analytical errors and may, therefore, lead to differences of opinion between purchasers and suppliers even despite the fact that a strong will to cooperate may exist on both sides. In a country like Holland, for example, where products of the most diverse origin are currently dealt with, the importance of eliminating such possible misunderstandings is obvious. It is equally clear that producers in the large industrial countries, who in addition to their domestic sales have an eye on the supply to the world market, are interested in bringing about a condition which would make it impossible to mistake the grade of quality of their products, in so far as this can be judged by means of chemical analysis. To bring about this condition requires, in the first place, unification of the analytical methods used, and this unification can hardly be attained in any more rapid and more thorough way than through international standardization of pigments, in addition to the standardization work already carried out in the several countries mentioned.

The situation explained above, with lead paints as an example, could be illustrated further by other pigments and products which play an important role in the field of paints. However, as this article is intended primarily to emphasize the fundamental aspects of the international problem under discussion, there is no need here to give further data which would, essentially, constitute merely a repetition of the same questions of principle.

In connection with the above-mentioned efforts of other countries to establish on a more reliable basis the analytical methods that are important for the testing of paint materials, the activities of the German Association for Testing Engineering Materials should be mentioned. This body is developing basic methods for the chemical analysis of pigments, of carriers, and of prepared paints. As far as we know, there is no publication showing how far these activities have progressed at the present time.

As indicated above, competent organizations in the several countries are working independently on the solution of problems whose importance is not denied by any expert party. Up to the present time, however, nothing has been heard of a mutual exchange of experience, which no doubt would be advantageous to all those having an interest in the matter and which would promote the development of the work and a recognition of the importance of its ultimate results.

The fact that the idea of international cooperation and an appreciation of the results that may be obtained thereby are growing in a most satisfactory manner has been indicated during the last few months. In October of last year the meetings held in Berlin on problems of corrosion and painting technique showed an attendance of foreign delegates which may be called remarkable for present conditions. Furthermore, the management of the Committee for Painting Technique of the Society of German Engineers and the Society of German Chemists sent personal invitations to a number of Dutch experts to attend two meetings of the Committee on November 24, 1932, in Cologne, the invitations being gladly accepted.

The development of such relations between experts in our profession in different countries is, perhaps, an ideal. But if this ideal is coupled with a recognition of the advantages of standardization, it will lead sooner or later to the realization of these advantages in the field of paints, just as they have already been realized in other fields. This purpose can now be attained in a relatively simple way, as soon as the initial step in this direction has been taken, because of the existence of the International Standards Association, which keeps continuously in touch with all national standardizing bodies.

If this article will contribute in any way toward calling the attention of other interested groups to the practical significance of the questions discussed above, its purpose has been attained.

ISA Report for 1932 Outlines Standardization Activities

Drafts of the annual report for 1932 of the International Standards Association (ISA) have recently been received by the ASA office. The report (in German) presents pertinent data summarizing the activities of the standardizing bodies of the 18 countries that are members of the ISA. Copies of this report are available for consultation or for loan by application to the American Standards Association.

The following is a list of the international technical committees now at work on various standardizing projects, together with the name of the country whose national standardizing body holds the secretariat for each project:

Project Number	*Title of Project*	*Secretariat*
1a	Screw Threads (inch system)	
1b	Bolts and nuts (inch system)	
1c	Widths across flats	Sweden
2a	Screw threads (metric system)	Switzerland
2b	Bolts and nuts (metric system)	Switzerland
3	Fits	Germany
4	Ball bearings	Sweden
5	Pipe and fittings	Switzerland
6	Paper sizes	Germany
7	Rivets	Netherlands
8a	Ocean navigation	Netherlands
8b	Inland navigation	Netherlands
9	Conversion tables, classification of standards, reports	ISA General Secretariat
10	Drawings	Switzerland
11	Test pressure for boilers	Czechoslovakia
12	Soil pipe	Czechoslovakia
13	Center heights of shafts	ISA General Secretariat
14	Shaft extensions	" " "
15	Couplings	" " "
16	Shafting keys	" " "
17	Iron and steel	Switzerland
18	Commercial zinc	Belgium
19	Standard diameters	Sweden
20	Aeronautics	Germany
21	Sprinkler systems	Austria
22	Automobile parts	France
23	Agricultural machinery	Germany
24	Sieves (testing)	Poland
25	Cast iron and cast steel	
26	Bronze, brass, etc.	
27	Coal	Poland
28	Petroleum products	United States
29	Drills and other tools	France
30	Fluid meters	France
31	Tires, rims, and tire valves	England (Institute of Automobile Engineers)
32	Preferred numbers	France

Of the above committees, American industry is cooperating through the American Standards Association on the following: Screw threads (1a); bolts and nuts (1b); widths across flats (1c); bolts and nuts (2b); fits (3); ball bearings (4); ocean navigation (8a); commercial zinc (18); automobile parts (22); testing sieves (24); coal (27); petroleum products (28); fluid meters (30); tires, rims, and tire valves (31); preferred numbers (32). For the project on petroleum products (ISA 28), the American Standards Association holds the secretariat, with the Sectional Committee on Nomenclature and Methods of Testing Petroleum Products and Lubricants (Z11), as the responsible technical group in the United States, handling American participation in this work. Dr. R. P. Anderson, of the American Petroleum Institute, secretary of the sectional committee, is the American representative on ISA 28.

The International Standards Association, of which the ASA is the American member-body, was founded at a conference held in New York in 1926, to provide for international cooperation in standardization work. At the present time the national standardizing bodies of the following 18 countries are members: Austria, Belgium, Czechoslovakia, Denmark, Finland, France, Germany, Holland, Hungary, Italy, Japan, Norway, Poland, Roumania, Russia, Sweden, Switzerland, the United States.

The ASA became a member of the ISA on October 1, 1929. Under the ISA constitution, final authority in the ISA in regard to policies and practices rests with the national standardizing bodies which are members. The chief executive body is the Plenary Assembly, composed of delegates nominated by the national standardizing bodies; meetings of this body are ordinarily held at three-year intervals. The officers of the ISA constitute its Council, which consists of the president (elected by the Plenary Assembly) and six other members, each of whom is appointed by a member-body. At the present time the president of the ISA is Professor Vladimir List, chairman of the national standardizing body of Czechoslovakia. C. E. Skinner, formerly assistant director of engineering of the Westinghouse Electric and Manufacturing Company, and a member of the ASA Standards Council, is the American representative on the Council of the ISA. The central office is located at Basle, Switzerland. A. Huber-Ruf, general secretary of the ISA, is in charge.

ASA PROJECTS

New Standard for Gear Materials

The American Standards Association has approved as American Recommended Practice a standard for Gear Materials and Blanks (B6.2-1933). The new standard covers forged and rolled carbon steel, steel castings, bronze and brass castings, and forged and rolled alloy steel. Each of these sections includes chapters on general specifications, manufacture, ladle and check analyses, finish, marking, inspection, rejection, and rehearing. Tables on chemical composition are also included for each type of material.

The standard was developed by the Sectional Committee on Standardization of Gears (B6), under the joint sponsorship of the American Gear Manufacturers' Association and the American Society of Mechanical Engineers. A review of all available standards on gears in the United States and Europe was carried on by the committee through ten subcommittees, which planned to approve these standards or revise them to bring them into accord with present-day practice.

The Subcommittee on Materials is the second to develop an American Standard, the recently approved standard on Spur Gear Teeth Form (B6.1-1932) having been submitted to ASA by this sectional committee.

In preparing the standard on Gear Materials and Blanks the subcommittee carefully reviewed the specifications prepared by the American Gear Manufacturers' Association and other organizations.

The standard is being printed and it is expected that copies will be available early in October.

Industrial Sanitation Committee Elects Officers

At a meeting of the Sectional Committee on Safety Code for Industrial Sanitation (Z4), which was held in New York on July 12, Dr. R. R. Sayers, of the U. S. Public Health Service, was elected chairman and Cyril Ainsworth, Assistant Secretary of the American Standards Association, was elected secretary of the committee. In addition to his chairmanship of this committee, Dr. Sayers is chairman of the Sectional Committee on Safety Code for Protection of the Heads and Eyes of Industrial Workers (Z2), and is a member of the Sectional Committee on Approval and Installation Requirements for Gas-Burning Appliances (Z21), and of the proposed committees on Work in Compressed Air (Z28) and on the Ventilation Code (Z5).

Realizing that the development of a complete Industrial Sanitation Code would greatly delay the approval of much-needed sections covering specific industries, the committee decided to subdivide the project into a series of standards covering various phases of the general subject. The first standard to be developed will cover manufacturing establishments; and when this is completed, those affecting mercantile establishments, labor camps, and other special groups will follow.

A draft of the section covering manufacturing establishments was revised and will be considered again at the next meeting of the committee, which will be held early in the fall.

The U. S. Treasury Department, Bureau of the Public Health Service, which is represented on the committee by Dr. Sayers, the newly elected chairman, is sponsor for the project.

C. A.

Requirements for Gas Appliances Submitted to ASA

The Sectional Committee on Approval and Installation Requirements for Gas-Burning Appliances (Z21) has submitted a revision of the Approval Requirements for Gas Ranges (Z21a-1932) to the American Standards Association for approval. The Requirements were originally approved by ASA nearly two years ago.

Other requirements covering hot plates and laundry stoves (Z210) have been submitted to the American Standards Association for approval, by the sponsor of the project, the American Gas Association. The requirements for hot plates and laundry stoves constitute the ninth standard prepared by this committee to be completed and submitted for approval.

Proposed Standards for Noise Measurement

A report on "Proposed Standards for Noise Measurement" was approved for circulation for a period of 60 days, to secure comment and suggestion, by the Sectional Committee on Acoustical Measurements and Terminology (Z24) at its meeting in Chicago on June 26. This report is now available in mimeographed form upon request to the American Standards Association.

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